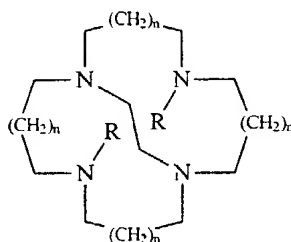


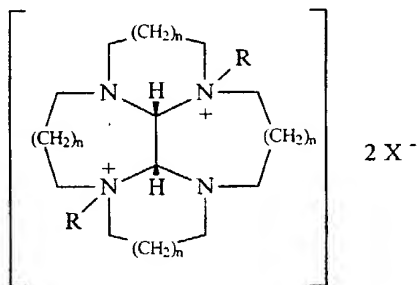
WHAT IS CLAIMED IS:

1. A process for preparing a tetraaza macrocyclic ligand having the formula:



wherein each R is independently C₁-C₈ linear or branched alkyl, -(CH₂)_xCO₂M, and mixtures thereof, provided both of the R units are not methyl; M is hydrogen or a salt forming cation; x is from 1 to 6; each index n is independently from 0 to 3; said process comprising the steps of:

- a) hydrogenating a tetraaza macrocyclic ligand precursor having the formula:



wherein X⁻ is an anion which provides charge neutrality, with from 1 ppm of a transition metal hydrogenation catalyst at a pH of at least 8 to form a tetraaza macrocyclic ligand; and

- b) optionally isolating said ligand.

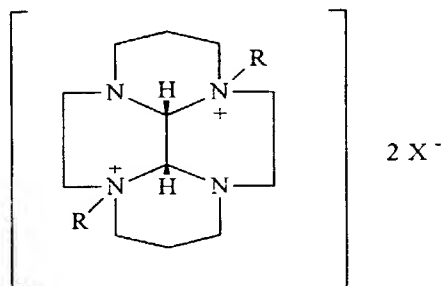
2. A process according to Claim 1 wherein said transition metal hydrogenation catalyst is selected from the group consisting of platinum, palladium, palladium hydroxide, rhodium, Raney nickel, and mixtures thereof.

3. A process according to either of Claims 1 or 2 wherein step (a) is conducted at a temperature of from 40° C to 100° C, at a pH of at least 10, and in the presence of a solvent, said solvent selected from the group consisting of water, N,N-dimethyl

formamide, methanol, ethanol, isopropanol, n-butanol, iso-butanol, tert-butanol, and mixtures thereof.

4. A process according any of Claims 1-3 wherein said precursor has the formula:

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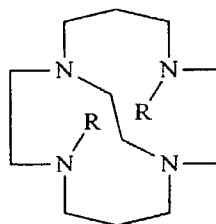
wherein R and X are the same as defined herein above.

5. A process according to any of Claims 1-4 wherein each R is ethyl.

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6. A process according to any of Claims 1-5 wherein one R is methyl and one R is ethyl.

7. A process for preparing a tetraaza macrocyclic ligand having the formula:



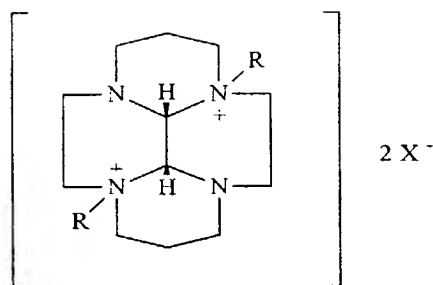
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wherein one R unit is methyl and the other R unit is selected from the group consisting of ethyl, propyl, butyl, pentyl, hexyl, and mixtures thereof; said process comprising the steps of:

- a) hydrogenating a tetraaza macrocyclic ligand precursor having the formula:

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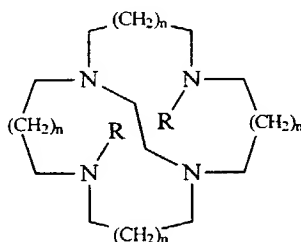
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wherein X^- is an anion which provides charge neutrality, with from 1 ppm of a palladium hydrogenation catalyst at a pH of at least 10 to form a tetraaza macrocyclic ligand; and

5 b) optionally isolating said ligand.

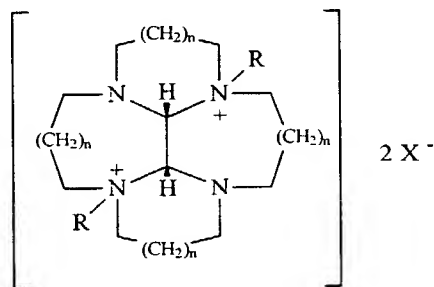
8. A process for preparing a tetraaza macrocyclic ligand having the formula:



10 wherein each R is independently C_1 - C_8 linear or branched alkyl, $-(CH_2)_xCO_2M$, and mixtures thereof, provided both of the R units are not methyl; M is hydrogen or a salt forming cation; x is from 1 to 6; each index n is independently from 0 to 3; said process comprising the steps of:

a) hydrogenating a tetraaza macrocyclic ligand precursor having the formula:

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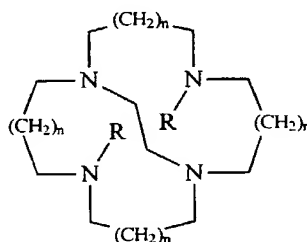
wherein X^- is an anion which provides charge neutrality, with from 1 ppm of a palladium hydrogenation catalyst, said palladium catalyst selected from the

group consisting of supported palladium(0), palladium hydroxide, and mixtures thereof; at a pH of at least 8; in the presence of a solvent, said solvent selected from the group consisting of water, methanol, ethanol, N,N-dimethyl formamide, n-butanol, iso-butanol, tert-butanol, and mixture thereof; at a temperature of from 0° C to 100° C; to form a tetraaza macrocyclic ligand; and

- b) removing the catalyst by filtration to form a crude filtrate;
- c) optionally isolating said ligand by crystallizing, extracting, distilling, or other suitable means.

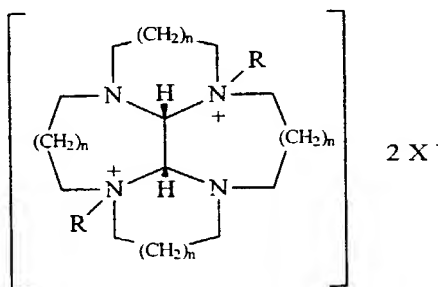
9. A process according to Claim 8 wherein said process further comprises the step of treating said ligand with manganese to form a cross-bridged tetraaza macrocyclic transition metal catalyst.

10. A process for preparing a tetraaza macrocyclic ligand having the formula:



wherein R units are R unit pairs selected from the group consisting of methyl and ethyl, diethyl, methyl and propyl, ethyl and propyl, methyl and butyl, ethyl and butyl, and mixtures thereof; M is hydrogen or a salt forming cation; x is from 1 to 6; each index n is independently from 0 to 3; said process comprising the steps of:

- a) hydrogenating a tetraaza macrocyclic ligand precursor having the formula:



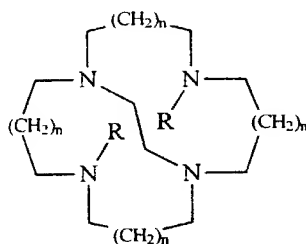
wherein X^- is an anion which provides charge neutrality, with from 1 ppm of a transition metal hydrogenation catalyst at a pH of at least 8 to form a tetraaza macrocyclic ligand; and

- b) optionally isolating said ligand.

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11. A transition metal catalyst comprising:

- a) a crossed-bridged ligand having the formula:



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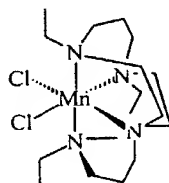
wherein each R is independently C_1 - C_8 linear or branched alkyl, $-(CH_2)_xCO_2M$, and mixtures thereof, provided both of the R units are not methyl or butyl; M is hydrogen or a salt forming cation; x is from 1 to 6; each index n is independently from 0 to 3;

- b) manganese; and

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- c) optionally one or more compatible ligands.

12. A compound according to Claim 11 having the formula:



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